IN THE SPECIFICATION:

Please amend the Federal Research Statement at the beginning of the specification to:

This invention was made with government support under Contract No. DE-FC26-~~97FT34365~~01NT41229 awarded by the U.S. Department of Energy. The government has certain rights in the invention.

Please amend paragragh [0005] to:

[0005] Drilling operations, especially to establish production of hydrocarbon deposits, frequently employ relatively long drill strings terminated by a bit. The drill string is usually fed through the floor of a drilling rig. As the bit bores through the earth, additional sections of drill pipe, tools, etc. are made up and become a portion of the drill string. The drill string may eventually reach as long as 20,000~~"~~ feet – 30,000~~"~~ feet, or even longer

Please amend paragragh [0007] to:

[0007]Interruptions in this electromagnetic connectivity create numerous problems. The most immediate problem is the inability to send and receive signals to downhole, instrumented tools and bits. However, this problem leads to another significant problem—namely, whether to proceed with drilling or to correct the connectivity problem. Fixing the connectivity problem typically involves tripping the drill string out of the bore, i.e., withdrawing the drill string one section at a time, and ~~dissembling~~ disassembling each section from the string. For relatively long drill strings, this may be a time-consuming practice costing significant amounts of money. Furthermore, if the interruption is toward the top of the drill string, it may be much more desirable to correct right away than it would be if the interruption were at the bottom of the drill string. Thus, it would be useful to know where in the drill string the interruption occurs. Knowing the location of the interruption would also be useful to expedite tripping the drill string out of the whole.

Please amend paragragh [0033] to:

[0033] FIG. 3A is an enlarged view of the made up joint 103 of FIG. 1. The two individual sections 106 are best shown in FIG. 4A – FIG. 4C. FIG. 3B is an enlarged view of a portion 303 of view in FIG. 3A of the joint 103. FIG. 4B – FIG. 4C are enlarged views of a portion 402 of a box end 409 and a portion 404 of the pin end 406 of the section 106 as shown in FIG. 4A.

As will be discussed further below, each section 106 includes a transmission path that, when the two sections 106 are mated as shown in FIG. 3A, aligns. When energized, the two transmission paths electromagnetically couple across the joint 103 to create a single transmission path through the drill string 102. The present invention is directed to testing the electromagnetic connectivity across joints in a drill string such as the joint 103 and, hence, the transmission path in the drill string 102. Various aspects of the particular transmission path of the illustrated embodiment are more particularly disclosed and claimed in the aforementioned United States Letters Patent 6,670,880. Pertinent portions of that patent are excerpted below. However, the present invention may be employed with other types of drill pipe and transmission systems.

Please amend paragragh [0068] to:

[0068] The conductor loop represented by the coils 503 and the electrical conductor 448 is completely sealed and insulated from the pipe of the section 106. The shield (not otherwise shown) should provide close to 100% coverage, and the core insulation should be made of a fully-dense polymer having low dielectric loss, e.g., from the family of polytetrafluoroethylene ("PTFE") resins, Dupont's Teflon® being one example. The insulating material (not otherwise

shown) surrounding the shield should have high temperature resistance, high resistance to brine and chemicals used in drilling muds. PTFE is again preferred, or a linear aromatic, semi-crystalline, polyetheretherketone thermoplastic polymer manufactured by Victrex PLC under the trademark PEEKÒ<u>®</u>. The electrical conductor 448 is also coated with, for example, a polymeric material selected from the group consisting of natural or synthetic rubbers, epoxies, or urethanes, to provide additional protection for the electrical conductor 448.

Please amend paragragh [0076] to:

[0076] The network analyzer 803, in turn, outputs the received reflected signal to the computing apparatus 809 over the line 827. The computing apparatus 809 is programmed with and executing a data handling software tool 827, such as one of the many commercially available from LABVIEWÒ<u>®</u>. The data handling software tool 827 may be, for instance, encoded on the random access storage (not shown) of the computing apparatus 809 and executed by the processor (also not shown) thereof. The data handling software tool 827 collects and displays the data representing the reflected signal along with a reference standard. For instance, the data handling software tool 827 may display the trace 700 as the reference representing a good connection and a trace representing the reflected signal on the display 830 of the computing apparatus 809. A user may then visually inspect the two traces to determine whether a good connection has been made.

Please amend paragragh [0085] to:

[0085] To accommodate the transmission of the anticipated volume of data, the drill string 903 will transmit data at a rate of at least 100 bits/second, and on up to at least 1,000,000 bits/second. However, signal attenuation is a concern. A typical length for a section of pipe (e.g., the section 106 in FIG. 4A), is 30~~"~~<u>feet to</u> 90~~"~~<u>feet</u>. Drill strings in oil and gas production can extend as long as 20,000~~"~~<u>feet to</u> 30,000~~"~~<u>feet</u>, or longer, which means that as many as 700 sections of drill pipe,

down hole tools, collars, subs, etc. can be found in a drill string such as the drill string 1203. The transmission line created through the drill string by the pipe described above will typically transmit the information signal a distance of 1,000 to 2,000 feet before the signal is attenuated to the point where amplification will be desirable. Thus, amplifiers, or "repeaters," 930 (only one shown) are provided for approximately for some of the components in the drill string 1203, for example, 5% of components not to exceed 10%, in the illustrated embodiment.

Please amend paragragh [0095]-[0097] to:

[0095] Communication links 10060 – 1006x-1 may be used to connect the nodes 10020 – 1002x to one another. The communication links 10060 – 1006x-1 may be comprised of cables or other transmission media integrated directly into sections 106 of the drill string 903, routed through the central bore of a drill string, or routed externally to the drill string. Likewise, in certain contemplated embodiments in accordance with the invention, the communication links 10060 – 1006x-1 may be wireless connections. In certain embodiments, the down-hole network 1000 may function as a packet-switched or circuit-switched network 1000.

[0096] As in most networks, a plurality of packets 1009, 1012 are used to transmit information among the nodes 10020 – 1002x. The packets 1012 may be used to carry data from tools or sensors, located down-hole, to an up-hole node 10020, or may carry protocols or data necessary to the functioning of the network 1000. Likewise, selected packets 1009 may be transmitted from up-hole nodes 10020 to down-hole nodes 10021 - 1002x. These packets 1009, for example, may be used to send control signals from a top-hole node 1002x to tools or sensors located proximate various down-hole nodes 10021 - 1002x. Thus, a down-hole network 1000 may provide an effective means for transmitting data and information between components located down-hole on a drill string 903, and devices located at or near the surface of the earth 102.

[0097] To accommodate the transmission of the anticipated volume of data, the drill string 903 will transmit data at a rate of at least 100 bits/second, and on up to at least 1,000,000 bits/second. However, signal attenuation is a concern. A typical length for a section 106 of pipe is 30" feet to 120" feet. Drill strings in oil and gas production can extend as long as 20,000" feet to 30,000" feet or longer, which means that as many as 700 sections of drill pipe, down hole tools, collars, subs, etc. can found in a drill string such as the drill string 903. The transmission line created through the drill string by the pipe described above will typically transmit the information signal a distance of 1,000 to 2,000 feet before the signal is attenuated to the point where amplification will be desirable. Thus, the repeaters 930 are provided for approximately for some of the components in the drill string 903, for example, 5% of components not to exceed 10%, in the illustrated embodiment. In the illustrated embodiment, the repeaters 930 are housed in the nodes 1002, as will be described more fully below, although this is not necessary to the practice of the invention.